

STATE OF SOUTH CAROLINA  
BEFORE THE PUBLIC SERVICE COMMISSION  
DOCKET NO. 2013-392-E

In the Matter of:	)	
	)	
Joint Application of Duke Energy Carolinas, LLC and North Carolina Electric Membership Corporation for a Certificate of Environmental Compatibility and Public Convenience and Necessity for the Construction and Operation of a 750MW Combined Generating Plant Near Anderson, SC	)	JOINT DIRECT TESTIMONY OF HAMILTON DAVIS AND JOHN D. WILSON ON BEHALF OF SOUTH CAROLINA COASTAL CONSERVATION LEAGUE AND SOUTHERN ALLIANCE FOR CLEAN ENERGY

1   **Q.   MR. DAVIS, PLEASE STATE YOUR NAME, POSITION, AND BUSINESS**  
2   **ADDRESS.**

3   A.   My name is Hamilton Davis. I am the Energy and Climate Director for the South  
4       Carolina Coastal Conservation League (“CCL”), and my business address is 328  
5       East Bay Street, Charleston, SC 29401.

6   **Q.   PLEASE STATE BRIEFLY YOUR EDUCATION, BACKGROUND AND**  
7   **EXPERIENCE.**

8   A.   I have a Bachelor of Science degree from Clemson University and a Juris Doctor  
9       degree from the University of South Carolina School of Law. I joined CCL in  
10       2006 and have directed the Energy and Climate program since 2009. I oversee all  
11       of CCL’s energy-related policy and regulatory work at the local, state, and federal  
12       level. I currently serve on a number of boards and committees, including the  
13       South Carolina Solar Business Alliance Board, the Energy Advisory Council for  
14       the S.C. Public Utility Review Committee, the S.C. Energy Office Advisory  
15       Committee, and the S.C. Offshore Wind Regulatory Task Force. I have

1 previously served on the S.C. Offshore Oil & Gas Legislative Study Committee,  
2 the S.C. Offshore Wind Legislative Study Committee, and the S.C. Shoreline  
3 Change Advisory Committee. A copy of my resume is attached as Davis/Wilson  
4 Exhibit 1.

5 **Q. HAVE YOU PREVIOUSLY TESTIFIED BEFORE THE SOUTH**  
6 **CAROLINA PUBLIC SERVICE COMMISSION (“COMMISSION”)?**

7 A. No, I have not yet had the opportunity to testify before the Commission, although  
8 I have previously appeared before the Commission in a 2012 allowable ex parte  
9 briefing on SCE&G’s integrated resource plan.

10 **Q. MR. WILSON, PLEASE STATE YOUR NAME, POSITION, AND**  
11 **BUSINESS ADDRESS.**

12 A. My name is John D. Wilson. I am Director of Research for Southern Alliance for  
13 Clean Energy (“SACE”), and my business address is 1810 16<sup>th</sup> Street, NW, 3<sup>rd</sup>  
14 Floor, Washington, DC 20009.

15 **Q. PLEASE STATE BRIEFLY YOUR EDUCATION, BACKGROUND AND**  
16 **EXPERIENCE.**

17 A. I graduated from Rice University in 1990 with a Bachelor of Arts degree in  
18 physics and history. I received a Master in Public Policy from the John F.  
19 Kennedy School of Government at Harvard University in 1992 with an emphasis  
20 in energy and environmental policy, and economic and analytic methods. Since  
21 1992, I have worked in the private, non-profit and public sectors on a wide range  
22 of public policy issues, usually related to energy, environmental and planning  
23 topics.

24 I became the Director of Research for SACE in 2007. I am the senior staff  
25 member responsible for SACE’s utility regulatory research and advocacy, as well

1 as energy resource analysis. In this capacity, I am responsible for leading  
2 dialogue with utilities and regulatory officials on issues related to resource  
3 planning and financial regulation, particularly as they relate to energy efficiency,  
4 renewable energy, and conventional generation resources. This takes the form of  
5 formal testimony, comments, presentations and/or informal meetings in the states  
6 of Georgia, Florida, North Carolina and South Carolina, and with respect to the  
7 Tennessee Valley Authority. A copy of my resume is attached as Davis/Wilson  
8 Exhibit 2.

9 **Q. HAVE YOU PREVIOUSLY TESTIFIED BEFORE THE COMMISSION?**

10 Yes, I testified before the Commission in Docket No. 2007-358-E, which  
11 concerned Duke Energy Carolinas, LLC's ("DEC" or the "Company") "Save-a-  
12 Watt" energy efficiency program, and in Docket No. 2009-226-E, a DEC general  
13 rate case.

14 **Q. ON WHOSE BEHALF ARE YOU TESTIFYING IN THIS CASE?**

15 A. We are testifying on behalf of CCL and SACE.

16 **Q. WHAT IS THE PURPOSE OF YOUR JOINT TESTIMONY?**

17 A. On October 24, 2013, Duke Energy Carolinas, LLC ("DEC" or the "Company")  
18 and the North Carolina Electric Membership Corporation ("NCEMC") filed a  
19 joint Application for a Certificate of Environmental Compatibility and Public  
20 Convenience and Necessity for the construction and operation of a 750 megawatt  
21 ("MW") combined cycle natural gas-fired generating facility at DEC's existing  
22 Lee Steam Station near Anderson, South Carolina (the "Lee NGCC unit"). DEC

1 proposes to own 650 MW of the unit, and NCEMC would own the remaining 100  
2 MW.

3 The purpose of our testimony is to highlight certain issues raised by the  
4 Application and make related recommendations to the Commission. We also  
5 critique the Company's position that its prior Integrated Resource Plans ("IRPs")  
6 demonstrated the need for a new combined cycle facility, and point out concerns  
7 regarding future NGCC units that DEC and Duke Energy Progress ("DEP")  
8 identify as potential future needs in their Joint Planning Scenario.<sup>1</sup>

9 **Q. PLEASE SUMMARIZE YOUR RECOMMENDATIONS TO THE**  
10 **COMMISSION.**

11 A. We are making three recommendations to the Commission. First, we recommend  
12 that the Commission condition any certification of the Lee NGCC unit on an in-  
13 service date of 2018, rather than 2017 as proposed in the Application. Second, we  
14 recommend that, in its review of IRPs and certification applications, the  
15 Commission ensure that DEC and DEP have exhausted cost-effective  
16 opportunities to defer or avoid the additional NGCC plants through lower-cost,  
17 lower-risk resources. Third, to take advantage of potential synergies between  
18 NGCC generation and solar generation and hedge against the risk of higher-than-  
19 projected fuel costs, we recommend that the Commission direct DEC to solicit  
20 developer interest in a 375 MW solar facility located at or near the Lee site at a  
21 cost consistent with the cost to operate the Lee NGCC unit.

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<sup>1</sup> We are not addressing NCEMC's claimed need for 100 MW of the Lee NGCC unit's capacity in this testimony.

1 **Q. PLEASE DESCRIBE YOUR ORGANIZATIONS' PAST WORK**  
2 **RELATED TO THE COMPANY'S RESOURCE PLANNING PROCESS**  
3 **THAT FORMS THE BASIS FOR THE CURRENT APPLICATION.**

4 A. CCL and SACE have participated in the Commission proceedings related to the  
5 DEC resource planning process for the past three planning cycles. In conjunction  
6 with the proceedings on the 2011 and 2012 DEC IRPs, our organizations obtained  
7 relevant documents and data from the Company; conducted a detailed analysis of  
8 the assumptions, methodology and conclusions in the Company's IRPs; and filed  
9 comments with the Commission reporting the results of that analysis, along with  
10 recommendations to improve DEC's resource planning. CCL and SACE are  
11 currently engaged in a similar effort with regard to DEC's 2013 IRP. In addition,  
12 SACE has participated in North Carolina Utilities Commission dockets related to  
13 the 2005, 2006, 2009, 2010, 2011 and 2012 DEC IRPs.

14 **Q. ARE YOU FAMILIAR WITH SOUTH CAROLINA'S REQUIREMENTS**  
15 **FOR CERTIFICATION OF NEW GENERATING FACILITIES?**

16 A. Yes, generally. Without purporting to offer a legal opinion, it is our  
17 understanding that the South Carolina Utility Facility Siting and Environmental  
18 Protection Act requires an applicant to obtain a Certificate of Environmental  
19 Compatibility and Public Convenience and Necessity ("certificate") before  
20 constructing a major utility facility like the Lee NGCC unit. S.C. Code Ann. §  
21 58-33-110. An application for a certificate must contain, at a minimum:

- 22 (a) a description of the location and of the major utility facility to
- 23 be built;
- 24 (b) a summary of any studies which have been made by or for
- 25 applicant of the environmental impact of the facility;
- 26 (c) a statement explaining the need for the facility; and
- 27 (d) any other information as the applicant may consider relevant or
- 28 as the commission may by regulation or order require.

1 S.C. Code Ann. § 58-33-120. The Commission may not grant a certificate unless  
2 it finds and determines:

- 3 (a) The basis of the need for the facility.
- 4 (b) The nature of the probable environmental impact.
- 5 (c) That the impact of the facility upon the environment is justified,  
6 considering the state of available technology and the nature and  
7 economics of the various alternatives and other pertinent  
8 considerations.
- 9 (d) That the facilit[y] will serve the interests of system economy  
10 and reliability.
- 11 (e) That there is reasonable assurance that the proposed facility  
12 will conform to applicable State and local laws and regulations  
13 issued thereunder, including any allowable variance provisions  
14 therein, except that the Commission may refuse to apply any local  
15 law or local regulation if it finds that, as applied to the proposed  
16 facility, such law or regulation is unreasonably restrictive in view  
17 of the existing technology, or of factors of cost or economics or of  
18 the needs of consumers whether located inside or outside of the  
19 directly affected government subdivisions.
- 20 (f) That public convenience and necessity require the construction  
21 of the facility.

22 S.C. Code Ann. § 58-33-160.

23 **Q. PLEASE SUMMARIZE YOUR CONCLUSIONS REGARDING THE**  
24 **APPLICATION.**

25 A. First, it does not appear that DEC has a need for 650 MW of NGCC capacity in  
26 2017. As discussed in greater detail later in this testimony, DEC has an adequate  
27 reserve margin for 2017, when calculated correctly. To the extent that DEC does  
28 need additional capacity in 2017, it could be met by short-term market power  
29 purchases or investment in a solar facility, as recommended below.

30 Second, DEC and DEP have not adequately pursued cost-effective energy  
31 efficiency and renewable energy alternatives that could have deferred the need for  
32 this unit, and that could defer or avoid entirely their projected need for several  
33 more major generation facilities. Over the next four years, the proposed Lee

1 NGCC unit is only the first of four to five projected NGCC units that DEC and  
2 DEP could seek to commit into the rate base paid for by their customers.

3 Third, fuel and other variable costs are forecast to make up 80 to 90  
4 percent of the revenue requirement associated with the proposed Lee NGCC unit;  
5 therefore, DEC should seek cost-effective alternatives to operating the unit even if  
6 the Commission issues a certificate and the unit is built and placed into service. A  
7 large utility-scale solar power development could complement the proposed unit,  
8 providing a cost-effective hedge against the risk to customers of future increases  
9 in natural gas prices.

10 **PROPOSED IN-SERVICE DATE FOR LEE NGCC UNIT**

11 **Q. DO YOU BELIEVE THAT DEC HAS AN ADEQUATE RESERVE**  
12 **MARGIN FOR 2017?**

13 A. Yes. DEC's application overstates its need for capacity in 2017 for two reasons:  
14 because it miscalculates its reserve margin, and because DEC should seek an  
15 arrangement to share capacity with its fellow Duke Energy operating company in  
16 the Carolinas, DEP.

17 **Q. COULD YOU EXPLAIN WHY DEC'S CALCULATION OF ITS RESERVE**  
18 **MARGIN RESULTS IN AN OVERSTATED NEED FOR CAPACITY?**

19 A. In its reserve margin calculation, DEC treats demand response as a resource with  
20 its own reserve requirement, contrary to North American Electric Reliability  
21 Corporation ("NERC") definitions and guidance.<sup>2</sup> In its order on the 2012 utility

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<sup>2</sup> CCL and SACE have commented on DEC's improper calculation of its reserve margin in comments to the Commission on DEC's 2011 and 2012 IRPs. See Comments of CCL, SACE and Upstate Forever on Duke Energy Carolinas, LLC's 2011 Integrated Resource Plan, Docket No. 2011-10-E (Oct. 31, 2011) at 10-11 and Comments of CCL, SACE and Upstate Forever on Duke Energy Carolinas, LLC's 2012 Integrated Resource Plan Docket No. 2012-10-E (Dec. 6, 2013) at 35-37.

1 IRPs issued on October 14, 2013, the North Carolina Utilities Commission  
2 (“NCUC”) stated that DEC “should consider demand response in programs that it  
3 is able to control or dispatch as adjustments to net internal demand, similar to  
4 DEP.”<sup>3</sup> DEC’s 2013 IRP, which was filed just days after the NCUC’s order, does  
5 not apply that method. DEP’s 2013 IRP has also improperly calculated its reserve  
6 margin, having switched to the method used by DEC which was recently rejected  
7 by the NCUC.

8 In assessing DEC’s reserve margin for purposes of this testimony, we  
9 adjusted the reserve margins of both DEC and DEP by treating demand response  
10 as a load adjustment consistent with NERC guidance and the NCUC’s recent  
11 order. This calculation revealed that DEC’s 2017 reserve margin was  
12 underestimated by about 102 MW, and DEP’s by about 128 MW, or a total of  
13 about 230 MW; these underestimates were slightly greater in 2018. We then  
14 applied this adjustment to correct DEC’s 2017 reserve margin under the Joint  
15 Planning Scenario, which DEC reports as 14.6%. Correcting the reserve margin  
16 for the 230 MW underestimation results in a Joint Planning Case Reserve Margin  
17 for 2017 of 15.3%—approximately about 260 MW above the 14.5% minimum  
18 planning reserve margin.

19 This indicates the 650 MW DEC claims to need from the proposed Lee  
20 NGCC unit are not needed to meet DEC’s 2017 minimum planning reserve  
21 margin if DEP and DEC arrange to share capacity, and that in fact, sharing of

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<sup>3</sup> North Carolina Utilities Commission, Order Approving Integrated Resource Plans and REPS Compliance Plans, Docket No. E-100, Sub 137 (Oct. 14, 2013) at 20-21.



1 capacity would result in 260 MW of available capacity in excess of their  
2 minimum planning reserve margins.

3 Even though DEC and DEP could meet system needs utilizing joint  
4 planning, they are not yet authorized to rely on the results of a joint planning case.  
5 Accordingly, in its 2013 IRP, DEC identified a need of 317 MW in 2017.  
6 Correcting the reserve margin calculation for DEC only (102 MW) results in a  
7 capacity need of 214 MW, which is less than one-third of the proposed 650 MW  
8 of capacity that DEC claims it needs. To the extent that a 214 MW shortfall  
9 needs to be addressed in 2017, short-term market power purchases or investment  
10 in the recommended solar facility discussed later in our testimony should be  
11 considered.

12 **Q. COULD JOINT PLANNING BY DEC AND DEP DEFER DEC'S NEED**  
13 **FOR NEW CAPACITY?**

14 A. Potentially. DEC acknowledges that under the Joint Planning Scenario, the  
15 proposed Lee NGCC unit could be deferred to 2018 “under the proper  
16 conditions,” and states that the Company will be investigating an arrangement to  
17 share capacity with DEP.<sup>4</sup> As a condition of any certification of the Lee NGCC  
18 unit, the Commission may wish to consider directing DEC to pursue the necessary  
19 regulatory proceedings and approvals to complete such an arrangement.

20 **Q. WHAT IS YOUR CONCLUSION ABOUT THE PROPOSED IN-SERVICE**  
21 **DATE FOR THE LEE NGCC UNIT?**

22 A. In 2018, DEC projects an additional 256 MW in resource needs. Considering  
23 DEC's need for 214 MW in 2017, coupled with the likelihood that DEP would

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<sup>4</sup> Direct Testimony of Janice D. Hager at 20.

1 have some resource needs in 2018 as well, the 2013 DEC IRP appears to support  
2 the need to add a generation unit in 2018. We therefore recommend that in any  
3 certification of the Lee NGCC unit, the Commission revise the in-service date to  
4 2018.

5 **IMPROVING THE CONSIDERATION OF ALTERNATIVES TO**  
6 **NATURAL GAS POWER PLANTS IN PLANNING**

7 **Q. COULD DEC HAVE AVOIDED THE NEED FOR THE PROPOSED LEE**  
8 **NGCC UNIT IN THE PROPOSED TIMEFRAME?**

9 A. Potentially. It is true that a major reason that DEC (and DEP) forecast thousands  
10 of megawatts of capacity needs over the next decade is that a number of aging  
11 coal-fired power plants have been or will soon be retired. Retirement of these  
12 aging, uneconomic plants is consistent with least-cost planning and the right  
13 decision for customers. However, another equally important reason for DEC's  
14 capacity needs is the Company's failure to exploit cost-effective alternatives to  
15 conventional generation.

16 As CCL and SACE have pointed out repeatedly in comments on the DEC  
17 and DEP IRPs over the past several years, DEC and DEP have failed to capture  
18 all cost-effective energy efficiency, the least-cost system resource. Nor have  
19 DEC and DEP fully explored renewable energy opportunities that could reduce  
20 risks to customers from variable fuel costs and other factors. If DEC and DEP  
21 had made greater investments in energy efficiency and pursued opportunities to  
22 procure renewable energy in South Carolina, it might have been possible to defer  
23 the proposed Lee NGCC unit—and the costs that it represents for customers—  
24 until a later date.

1   **Q.   WHAT ADDITIONAL NATURAL GAS COMBINED CYCLE UNITS ARE**  
2   **PROJECTED BY DEC AND DEP DURING THE NEXT DECADE?**

3   A.   The proposed Lee NGCC unit is only the first of five NGCC units projected by  
4       DEC and DEP over the next decade, taken together. If DEC and DEP are able to  
5       shift to joint planning, one NGCC unit would change to a CT unit, and all but one  
6       NGCC unit could be delayed for at least one year.<sup>5</sup>

7   **Q.   IS DEC ADEQUATELY PURSUING ENERGY EFFICIENCY AS A COST-**  
8   **EFFECTIVE ALTERNATIVE TO THE PROJECTED NEED FOR**  
9   **SEVERAL MORE MAJOR GENERATION FACILITIES?**

10  A.   No. While it is unlikely that all of the forecast NGCC units can be avoided  
11       through energy efficiency alone, aggressive but achievable levels of energy  
12       efficiency could avoid at least 900 MW in needed capacity by 2022.

13               Over the past several years, CCL and SACE have recommended that DEC  
14       and DEP develop energy efficiency programs designed to achieve at least 1%  
15       retail savings per year, or roughly 10% reduction in demand and load over a 10  
16       year period. In its 2013 IRP, DEC projects energy efficiency programs will  
17       reduce demand and load by about 5% by 2022, or just over 900 MW. Achieving  
18       this level of savings will avoid the need for at least one large generating unit.  
19       However, if DEC doubled the performance of its energy efficiency programs  
20       through 2022 and achieved 10% savings—a rate achieved by numerous utilities  
21       across the nation—DEC could avoid at least one additional NGCC plant. Similar  
22       performance by DEP could result in reducing the four or five planned NGCC  
23       units to only two or three such units. And if DEC and DEP pursued all available

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<sup>5</sup> DEC 2013 IRP, Table 8-H.

1 cost-effective energy efficiency, it could be possible to defer and even eventually  
2 avoid even more of the planned NGCC capacity.

3 **Q. COULD WIND AND SOLAR RESOURCES DEFER, ELIMINATE OR**  
4 **REDUCE THE NEED FOR THE REMAINING TWO TO THREE NGCC**  
5 **UNITS?**

6 A. Due to deficient evaluation of renewable energy resources in prior IRPs, it is  
7 unclear how much of the Company's identified need for additional capacity  
8 through 2022 could be met with renewable energy resources like wind and solar.  
9 Only in the 2013 IRPs have DEC and DEP provided any evaluation of renewable  
10 energy as a resource (as opposed to a compliance strategy), and we have not yet  
11 obtained the data supporting that evaluation. In contrast, another major electric  
12 utility in the region, Georgia Power, plans to have over 750 MW of solar on its  
13 system by 2018. Notably, a 2012 report from the South Carolina Public Utility  
14 Review Committee ("PURC") Energy Advisory Council ("EAC") concluded that  
15 there is over 1,700 megawatts of near-term solar potential available in South  
16 Carolina.

17 Furthermore, while DEC and DEP have acknowledged the market-driven  
18 growth in installation of solar power by their customers, neither utility's IRP  
19 evaluated sharp increases in distributed solar generation. Recently, the PURC  
20 EAC's initial draft report on distributed energy resources identified the potential  
21 for large numbers of South Carolina utility customers to meet some or all of their  
22 energy needs from distributed generation, including solar. According to the  
23 report:

1 As a State, we are poised on the edge of a sea change that requires  
2 proactive policymaking and the *Energy Advisory Council* (EAC)  
3 recognizes that it will be best to ride the crest of the *distributed-*  
4 *generation* wave in a proactive rather than reactive way. How  
5 state policymakers structure the legal, regulatory, and economic  
6 environment will be critical in setting the stage for successful  
7 development and promotion of *distributed generation* in South  
8 Carolina.<sup>6</sup>

9 The report also notes the potential for customers to purchase electricity from  
10 third-party vendors. The Energy System Freedom of Ownership Act currently  
11 pending in the General Assembly would allow two percent (2%) of a utility's  
12 peak system demand to be met by third-party sales of distributed renewable  
13 resources.<sup>7</sup>

14 **Q. ARE THERE OTHER NEW GENERATION PROJECTS IN SOUTH**  
15 **CAROLINA THAT RELATE TO THE NEED FOR NEW NGCC UNITS?**

16 A. The V.C. Summer nuclear units 2 and 3 now under construction by SCANA and  
17 the South Carolina Public Service Authority ("Santee Cooper") will result in  
18 significant excess generation capacity on the Santee Cooper system. As the  
19 Commission is aware, in accordance with the Commission's policy that "joint  
20 ownership of new nuclear units in South Carolina is to be encouraged among the  
21 electric service providers operating in whole or in part in South Carolina," DEC  
22 has "committed to continuing to pursue good faith negotiations with [Santee  
23 Cooper] and/or SCANA regarding an interest in V.C. Summer Units 2 and 3."<sup>8</sup> It  
24 is our understanding that Santee Cooper remains in negotiations with DEC, DEP

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<sup>6</sup> State Regulation of Public Utilities Review Committee Energy Advisory Council, Distributed Energy Resources Initial Draft Report (November 2013) at 1, available at <http://www.scstatehouse.gov/committeeinfo/EnergyAdvisoryCouncil/EAC Distributed Energy Resources Initial Draft Report.docx>.

<sup>7</sup> House Bill 3425; Senate Bill 536.

<sup>8</sup> Commission Order No. 2011-454 at 4.

1 and multiple out-of-state utilities in an effort to sell additional ownership or  
2 capacity shares in the new V.C. Summer units.

3 We believe that it is in the best interest of utility customers and South  
4 Carolina citizens to have a robust resource planning process in place that is  
5 capable of anticipating and addressing situations of this type. Excess generation  
6 capacity can compromise opportunities for increased investment in lower-cost  
7 energy efficiency and lower-risk renewable energy resources, as well as place  
8 unnecessary increased burdens on utility customers in the form of higher rates.

9 **Q. IN LIGHT OF IMPACTS TO CUSTOMERS OF EXCESS CAPACITY,**  
10 **WHAT DO YOU RECOMMEND?**

11 A. We recommend that the Commission ensure that South Carolina utilities,  
12 including DEC and DEP, pursue all available cost-effective energy efficiency and  
13 renewable energy resources. To this end, we recommend that the Commission  
14 carefully scrutinize IRPs and certification applications, including the likely  
15 upcoming proposals for additional NGCC plants, to ensure that the state's utilities  
16 have fully exhausted lower-cost, lower-risk resources before building new fossil  
17 or nuclear generation.

#### 18 **UTILITY SCALE SOLAR ENERGY RESOURCES**

19 **Q. WHY SHOULD THE COMMISSION CONSIDER SOLAR ENERGY**  
20 **RESOURCES AS PART OF THIS DOCKET?**

21 A. The proposed Lee NGCC unit would provide power, reliability and other services  
22 to the DEC system. The type of unit proposed can be started and reach full output  
23 very quickly, so it meets system reliability needs even when it is not operating.  
24 Because the proposed Lee NGCC unit is of a technology class that offers fast

1           ramping capability, it appears well suited for supporting a transition to a future  
2           with a high penetration of solar, wind and other renewable energy resources.

3   **Q.   IF THE COMMISSION CERTIFIES THE LEE NGCC UNIT AND IT IS**  
4   **BUILT, WHY WOULD IT BE IN CUSTOMER INTEREST FOR DEC TO**  
5   **SEEK COST-EFFECTIVE ALTERNATIVES TO OPERATING THE**  
6   **UNIT?**

7   A.   Since operational costs, mainly fuel, account for 80 to 90 percent of the revenue  
8       requirement associated with the plant—that is, the cost of the plant that will be  
9       borne by customers—DEC’s customers will benefit from any cost-effective  
10      alternative to operating the unit, such as energy efficiency or solar energy.

11   **Q.   WHAT IS THE BASIS FOR YOUR ASSERTION THAT FUEL AND**  
12   **OTHER VARIABLE COSTS ARE FORECAST TO MAKE UP 80-90% OF**  
13   **THE REVENUE REQUIREMENT ASSOCIATED WITH THE**  
14   **PROPOSED LEE NGCC UNIT?**

15   A.   As discussed in the direct testimony of DEC witness Janice D. Hager, the 2012  
16      IRP’s identified need for a 700 MW NGCC facility in 2016 formed the original  
17      basis for the RFP process in which the Lee NGCC unit was selected. Forecasted  
18      costs for the generic 700 MW NGCC unit included fuel, variable, fixed and  
19      capital costs for each year from 2016-32. These data indicate that fuel and other  
20      variable costs make up 80 to 90 percent of the annual revenue requirement  
21      forecast for this unit in the 2012 IRP.<sup>9</sup> Although DEC does not appear to have  
22      done a head-to-head comparison of its generic NGCC unit with the proposed Lee  
23      NGCC unit, based on DEC witness Hager’s testimony it appears that the proposed  
24      unit’s costs closely resembles those of the generic unit.<sup>10</sup>

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<sup>9</sup> Data provided by DEC from its 2012 IRP were relied upon for this calculation because we had not yet received detailed information from DEC from its 2013 IRP.

<sup>10</sup> Direct Testimony of Janice D. Hager at 19.

1 **Q. WOULD IT BE FEASIBLE TO BUILD A SOLAR POWER PLANT THAT**  
2 **DELIVERS POWER AT A COST COMPARABLE TO THE FORECAST**  
3 **OPERATING COST FOR THE PROPOSED LEE NGCC UNIT?**

4 A. Yes. Utility-scale solar power may be developed at a cost that appears to be about  
5 the same as the long-term operating cost of the proposed Lee NGCC unit. This  
6 conclusion is based on the following assumptions:

- 7 • If in line with recent industry estimates, the capital cost of the proposed  
8 Lee NGCC unit would be at least \$1,000 per kW.<sup>11</sup>
- 9 • The operating cost of the proposed Lee NGCC unit is about eight times  
10 the revenue requirement of its capital costs (*i.e.*, operating costs are 80 to  
11 90 percent of total costs), or at least \$8,000 per kW if fuel and other  
12 variable costs, as forecast, are expressed as an up-front capital cost.
- 13 • The output of a solar facility is about 25% that of the proposed Lee NGCC  
14 unit, assuming a 22% solar capacity factor and a 90% NGCC plant  
15 capacity factor.<sup>12</sup>

16 Based on these assumptions, a utility-scale solar power facility constructed for  
17 \$2,000 per kW would be cost-effective relative to the long term operating cost of  
18 the proposed Lee NGCC unit. Currently, industry experts estimate that solar  
19 developers are building solar projects at a cost that ranging from under \$2,000 per  
20 kW (Lazard) to under \$4,000 per kW (Lawrence Berkeley National Laboratory).

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<sup>11</sup> Lazard, Lazard's Levelized Cost of Energy Analysis – Version 7.0 (August 2013).

<sup>12</sup> Utility-scale solar net capacity factors typically exceed 20% for both fixed-tilt and tracking systems in the Southeast. See Lawrence Berkeley National Laboratory, *Utility-Scale Solar 2012: An Empirical Analysis of Project Cost, Performance and Pricing Trends in the United States* (September 2013). Industry experts, relying on these data, have advised the Tennessee Valley Authority that a 22% capacity factor for utility-scale systems is an appropriate value. This represents an increase over recent values, driven by project designs that oversize the PV array relative to inverter capacity, resulting in an increased capacity factor (in AC terms).



- 1    **Q.    WOULD MORE PRECISE DATA HELP REFINE THE ESTIMATED**  
2    **COST FOR A COST-EFFECTIVE UTILITY-SCALE SOLAR**  
3    **DEVELOPMENT AT THE SITE PROPOSED FOR THE LEE NGCC**  
4    **UNIT?**
- 5    A.    Yes. DEC's 30-year forecast of fuel and other variable costs could be used to  
6    develop a benchmark price per kW at which customers would be indifferent  
7    between natural gas and solar power. DEC should also develop specific operating  
8    expectations (e.g., annual output per kW installed) for the solar facility to use in  
9    calculating this benchmark. Any impacts of operational changes, such as  
10   increased ramping, on the operating costs of the proposed Lee NGCC unit should  
11   also be taken into consideration.
- 12   **Q.    WHAT WOULD HAPPEN IF A SOLAR PROJECT CANNOT BE**  
13   **DEVELOPED AT OR BELOW THE BENCHMARK PRICE OF \$2,000**  
14   **PER KW (AS REFINED BY MORE PRECISE DATA)?**
- 15   A.    Subject to appropriate parameters, such as periodic refreshment of bids or re-  
16   issuance of RFPs, DEC could simply wait until a cost-effective solar power  
17   development proposal was received. Since the power plant can produce its full  
18   output upon completion, there would be no impact on reliability.
- 19   **Q.    HOW LARGE SHOULD A SOLAR POWER PLANT AT THE LEE SITE**  
20   **BE?**
- 21   A.    A cost-effective solar facility could be as large as the combined output of all the  
22   generating units at the Lee site, without creating any reliability concerns  
23   (assuming all the fossil units stand idle during periods of full solar output). The  
24   proposed Lee NGCC unit would likely to be one of the most fuel-efficient plants  
25   on the DEC system, and thus a solar power plant that meets the criteria we

1 described above would also be less costly than other existing units at the same  
2 location.

3 **Q. CAN YOU PROVIDE EXAMPLES OF THE TYPE OF UTILITY-SCALE**  
4 **SOLAR POWER PLANT THAT COULD BE APPROPRIATE AT THE**  
5 **LEE SITE?**

6 A. Yes, we can offer two examples of the type of solar power plant that should be  
7 technically feasible in South Carolina.

8 First, the largest operational solar photovoltaic (“PV”) plant in the world is  
9 First Solar’s Agua Caliente Solar Project in Arizona. Upon completion, Agua  
10 Caliente will have a generating capacity of 290 MW (AC). The plant is  
11 connected to a 500 kV transmission line and includes grid integration and plant  
12 control systems to manage grid reliability and stability. First Solar’s plant design  
13 includes capabilities to regulate voltage, frequency and power factor; control  
14 active and reactive power, ramp rates, and power curtailments; and ride through  
15 faults and disturbances. These capabilities allow the plant to operate more like a  
16 thermal generation plant than a typical solar PV project.<sup>13</sup>

17 Second, Xcel Colorado recently proposed adding 450 MW of wind, 170  
18 MW of utility-scale solar, and 317 MW of natural gas generation.<sup>14</sup> According to  
19 the independent evaluator’s report, the wind and solar reduce the overall system  
20 cost by \$262 million.<sup>15</sup> Notably, the operating cost would be reduced by \$246

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<sup>13</sup> First Solar website, <http://www.firstsolar.com/Projects/Agua-Caliente-Solar-Project> (accessed December 6, 2013).

<sup>14</sup> Xcel Colorado website, [http://www.xcelenergy.com/About Us/Energy News/News Releases/Xcel Energy proposes adding economic solar, wind to meet future customer energy demands](http://www.xcelenergy.com/About%20Us/Energy%20News/News%20Releases/Xcel%20Energy%20proposes%20adding%20economic%20solar,%20wind%20to%20meet%20future%20customer%20energy%20demands) (accessed December 6, 2013).

<sup>15</sup> Accion Group, Independent Evaluator’s Final Report: Public Service Company of Colorado, 2013 All-Source Solicitation, Colorado Public Utilities Commission Proceeding 11A-869E (October 9, 2013),

1 million (i.e., total cost savings less surplus capacity cost benefits), consistent with  
2 our finding that a utility-scale solar power project could help to offset the  
3 operating costs of the proposed Lee NGCC unit.

4 These two projects illustrate how a large PV solar project could offer the  
5 scale and operational characteristics necessary to complement to the proposed Lee  
6 NGCC unit and also reduce the overall cost to customers associated with owning  
7 and operating the unit. A large-scale solar project could offer a substantial  
8 economic development opportunity as well. Installation of a large solar PV  
9 project at the Lee site would allow DEC to take advantage of appropriately scaled  
10 transmission interconnection facilities, but the Commission may also wish to  
11 consider multiple smaller solar projects.

12 **Q. COULD MULTIPLE SMALLER SOLAR PROJECTS BE A GOOD**  
13 **ALTERNATIVE OR COMPLEMENT TO A SINGLE LARGE SOLAR**  
14 **INSTALLATION AT THE LEE SITE?**

15 A. Yes. Siting considerations and existing transmission infrastructure could make a  
16 portfolio of smaller utility-scale solar installations economically and/or  
17 operationally preferable to a single large solar installation at or near the Lee site.  
18 Individual projects in such a portfolio could range from approximately 10 MW to  
19 100 MW, and could be sited across DEC's South Carolina service territory in  
20 favorable locations based on local load, transmission congestion, existing  
21 infrastructure, and land availability.

22  

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available at [https://www.dora.state.co.us/pls/efi/EFI.Show\\_Filing?p\\_fil=G\\_195074&p\\_session\\_id=](https://www.dora.state.co.us/pls/efi/EFI.Show_Filing?p_fil=G_195074&p_session_id=)  
(accessed December 10, 2013).

1 **Q. WHAT WOULD BE THE RISKS OF MAKING A LARGE INVESTMENT**  
2 **IN SOLAR POWER?**

3 A. Natural gas prices may turn out to be lower than forecast. DEC's current natural  
4 gas fuel price forecast is intended to represent a price range that is a midpoint  
5 among reasonably foreseeable prices. If the solar power plant costs \$2,000 per  
6 kW (as assumed above), but natural gas fuel prices average 75% below forecast,  
7 then customers would end up paying \$500 per kW more for the solar power plant  
8 than they would have to operate the natural gas unit.

9 **Q. WHAT ARE THE POTENTIAL BENEFITS OF MAKING A LARGE**  
10 **INVESTMENT IN SOLAR POWER?**

11 A. A large, co-located, utility-scale solar power project could mitigate risks and  
12 reduce the operating costs of the Lee NGCC unit with the following quantifiable  
13 benefits:

- 14 • Direct cost savings: If the actual cost to build a solar power plant is \$1,500  
15 per kW (as forecast by Lazard for 2015), then customers would save \$500  
16 per kW.
- 17 • Long term fuel price risk mitigation: If natural gas fuel prices average  
18 25% above forecast—a potential outcome given the history of gas price  
19 volatility and upward pressure caused by demand for this fuel—then  
20 customers would save \$500 per kW.
- 21 • Short term fuel price spike mitigation: If natural gas fuel prices spike  
22 temporarily due to market disruption, the impact on the fuel cost recovery  
23 rates would be mitigated by solar power generation.
- 24 • Regulatory risk mitigation: A co-located solar power plant could provide  
25 direct emissions reduction benefits for any plant or system emission limits  
26 for carbon dioxide under Clean Air Act Section 111(d).

27 In addition, construction of a solar power plant would have economic  
28 development benefits in the form of jobs and business development in South

1 Carolina. On the other hand, reduced operation of the proposed Lee NGCC unit  
2 would primarily impact out-of-state natural gas suppliers.

3 **Q. WHAT STEPS DO YOU RECOMMEND THAT THE COMMISSION**  
4 **REQUIRE DEC TAKE TO UTILIZE SOLAR POWER TO REDUCE THE**  
5 **OPERATING COST OF THE PROPOSED LEE NGCC UNIT?**

6 A. We recommend that the Commission, as a condition of any certification of the  
7 proposed Lee NGCC unit, require the Company to develop or procure, through an  
8 RFP process initiated in 2014, an additional 375 MW of solar capacity at or near  
9 the Lee site.<sup>16</sup> No definite in-service date or specific minimum amount that must  
10 be delivered at any particular time should be required; we further recommend that  
11 the Commission require that the best proposals that meet DEC's minimum terms  
12 be accepted up to 375 MW of solar capacity.

13 **Q. DOES THAT CONCLUDE YOUR DIRECT TESTIMONY?**

14 A. Yes, it does.

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<sup>16</sup> The 375 MW of solar capacity represents 50% of the capacity proposed for the Lee NGCC unit.

STATE OF SOUTH CAROLINA  
BEFORE THE PUBLIC SERVICE COMMISSION  
DOCKET NO. 2013-392-E

In the Matter of:	)	
	)	
Joint Application of Duke Energy	)	
Carolinas, LLC and North Carolina	)	
Electric Membership Corporation	)	CERTIFICATE OF SERVICE
for a Certificate of Environmental	)	
Compatibility and Public	)	
Convenience and Necessity for the	)	
Construction and Operation of a		
750MW Combined Generating Plant		
Near Anderson, SC		

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I certify that the following persons have been served with one (1) copy of Joint Direct Testimony of Hamilton Davis and John D. Wilson on Behalf of South Carolina Coastal Conservation League and Southern Alliance for Clean Energy by electronic mail and/or U.S. First Class Mail at the addresses set forth below:

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This 10th day of December, 2013.

s/ Robin G. Dunn